MECH 7003 ADVANCED DYNAMIC SYSTEMS

Credit Points 10

Legacy Code 301019

Coordinator Helen Wu (https://directory.westernsydney.edu.au/search/name/Helen Wu/)

Description This subject covers three-dimensional kinematics and kinetics of a rigid body. The principles of virtual work are used to investigate the equilibrium and dynamics of mechanisms. Some key aspects of mechanical vibrations are introduced, including vibration response, vibration isolation and vibration measurement.

School Eng, Design & Built Env

Discipline Mechanical Engineering

Student Contribution Band HECS Band 2 10cp

Level Postgraduate Coursework Level 7 subject

Restrictions

Students must be enrolled in a postgraduate program

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Use Virtual work to determine the equilibrium position of a mechanism
2. Analyse the three-dimensional kinematics and kinetics of a rigid body
3. Model a real world system as a collection of simple mechanical components
4. Determine the response to free and forced vibrations using standard differential methods or Laplace transforms
5. Balance a rotating disk to reduce vibrations according to standards
6. Analyse vibration isolation systems and measurement systems
7. Verify the theory presented in the lectures by taking the measurements in the real world and use them for verification purposes

Subject Content

1. Virtual work and potential energy method
2. Three-dimensional kinematics and kinetics of a rigid body
3. Modelling a real world system and determining the equations of motion for mechanical systems
4. Response to free and forced vibrations
5. Balancing a rotating disk
6. Vibration isolation
7. Vibration measurement
8. Using Laplace transforms to determine the response to impulse and step forces.

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task
Final Exam	2 hours	50	N	Individual
Quiz	4 x 1 hour	20	N	Individual
Report	10 pages	20	N	Individual
Practical	2 times x 3 hours each	10	N	Individual

Teaching Periods

Autumn (2022)
Parramatta City - Macquarie St
Day
Subject Contact Helen Wu (https://directory.westernsydney.edu.au/search/name/Helen Wu/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MECH7003_22-AUT_PC_D#subjects)

Autumn (2023)
Parramatta City - Macquarie St
On-site
Subject Contact Helen Wu (https://directory.westernsydney.edu.au/search/name/Helen Wu/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH7003_23-AUT_PC_1#subjects)